

I claim:

1. An oscillating support for maintaining a tray spaced apart from a base, said tray reciprocating backward and forward at an uneven rate in order to cause particulate material to advance along said tray, said support having a pair of joints, one of which joining said support to said reciprocating tray and the other of which joining said support to said base, resilient means associated with either one of said joints for opposing the forward movement of said tray and for urging said tray backward.
2. An oscillating support for maintaining a tray spaced apart from a base, said tray advancing forward from a starting point then returning backward to said starting point, the rate of advance being less than the rate of return in order to cause particulate material to advance along said tray, said support having a pair of joints, a first said joint for joining said support to said reciprocating tray and a second said joint joining said support to said base, resilient means associated with either one of said joints for opposing the advance of said tray away from the starting point and for urging said tray to return to the starting point.
3. The oscillating support of claim 1 wherein said resilient means is associated with said first joint.
4. The oscillating support of claim 1 wherein said resilient means is associated with both of said joints.
5. The oscillating support of claim 2 wherein said resilient means is associated with said first joint.
6. The oscillating support of claim 2 wherein said resilient means is associated with both of said joints.

7. In combination, an oscillating support for maintaining a tray spaced apart from a base and a driving apparatus for causing said tray to reciprocate such that said tray advances from a starting point to an end point and then returns to said starting point, said support having a first said joint for joining said support to said reciprocating tray and the second said joint joining said support to said base, said first joint having a shank connected to said tray and a socket connected to said stem, said shank being received in said socket and pivoting forward when said tray advances and pivoting backward when said tray returns to the starting point, resilient means for opposing forward pivotal movement of said shank and for urging backward pivotal movement of said shank.

8. In combination, an oscillating support for maintaining a tray spaced apart from a base and a driving apparatus for causing said tray to reciprocate such that said tray advances from a starting point to an end point and then returns to said starting point, said support having a pair of joints and a stem extending therebetween, a first said joint for joining said support to said reciprocating tray and a second said joint joining said support to said base, said second joint having a shank and a socket, said shank being connected to said base and said socket being connected to said stem, said shank being received in said socket and pivoting forward when said tray advances and pivoting backward when said tray returns to the starting point, resilient means for opposing forward pivotal movement of said shank and for urging backward pivotal movement of the shank.

9. In combination, an oscillating support for maintaining a tray spaced apart from a base and a driving apparatus for causing said tray to reciprocate such that said tray advances from a starting point to an end point and then returns to said starting point said support having a pair of joints, a

first said joint for joining said support to said reciprocating tray and a second said joint joining said support to said base, each said joint having a shank and a socket, the shank of the first said joint being connected to said tray and the shank of the second said joint being connected to said base, said sockets of the first and second said joints being interconnected, each said shank being received in a separate said socket and pivoting forward when said tray advances and pivoting backward when said tray returns to the starting point, resilient means for opposing forward pivotal movement of said shank and for urging backward pivotal movement of said shank.

10. The combination as claimed in claim 7 wherein said resilient means is disposed within each said socket and is located between said shank and said socket

11. The combination as claimed in claim 7 wherein said driving apparatus causes said tray to advance on its forward stroke from a starting point through a first distance in which said tray accelerates followed by a second distance in which said tray decelerates to an end point where said tray is momentarily stationary after which said tray returns to said starting point through a third distance in which said tray accelerates followed by a fourth distance in which said tray decelerates to said starting point, said first distance being longer than said second distance and said third distance being shorter than said fourth distance.

12. The combination of claim 11 in which the first distance is approximately twice the second distance and the third distance is approximately one half of the fourth distance.

13. The combination as claimed in claims 7 wherein said driving apparatus causes said tray to advance on its forward stroke from a starting point to an end point and then on its return stroke to return to said starting point, said tray, while advancing, first accelerating then decelerating to said end point where said tray is momentarily stationary, the rate of acceleration being less than the

rate of deceleration during the advance, said tray, while returning to said starting point, first accelerating then decelerating, the rate of acceleration exceeding the rate of deceleration during the return.

14. The combination as claimed in claim 7 wherein said driving means apparatus comprises: a cam; a drive shaft rotating about an axis and causing said cam to rotate; a follower having a slot formed therein for receipt of said cam, said cam as it rotates, rolling backward and forward in said slot and imparting rotation to said follower; a connecting rod affixed to said follower and being rotated thereby, said connecting rod rotating about a stationary axis which is parallel to but offset from the axis of the rotation of said drive shaft; a crank rotated by said connecting rod and being adapted to be operatively connected to the shaking tray for imparting reciprocating motion to said tray.

15. The combination of claim 14 wherein said operative connection includes: a coupling rotatably connected to said crank; a bar mounted to oscillate and being connected to said coupling, said shaking tray being adapted to be operatively connected to said bar and to be reciprocated thereby.

16. The combination of claim 15 wherein said operative connection includes: a coupling rotatably connected to said crank; a pair of parallel oscillating and rotating bars; at least one spacer which interconnects said bars and maintains said bars in a spaced relationship, said rotating bar being mounted for rotation and said oscillating bar being pivotally connected to said

coupling and being caused to reciprocate thereby, said shaking tray being adapted to be operatively connected to said oscillating bar and to be reciprocated thereby.

17. The combination of claim 16 wherein said operative connection between said oscillating bar and said shaking tray includes: a drive block adapted to be connected to said shaking tray and having a wall seated upon said oscillating bar, said oscillating bar imparting linear movement to said drive block.

18. The combination of claim 14 further including a wrist pin mounted for rotation to said crank, said pin having means for pivotal connection to said shaking tray.

19. The combination of claim 7 wherein said driving apparatus includes a shaft rotating about an axis; a link rotated by said drive shaft about an axis offset from the axis of rotation of said drive shaft; a follower connected to said link for rotation about an axis offset from the axis of rotation of said link; a connecting rod affixed to said follower and being rotated thereby; a crank rotated by said connecting rod and being adapted to be operatively connected to the shaking tray for imparting reciprocating motion to said tray.

20. The combination of claim 19 wherein said operative connection includes: a coupling rotatably connected to said crank; a bar mounted to reciprocate and being connected to said coupling, said shaking tray being adapted to be operatively connected to said bar and to be reciprocated thereby.

21. The combination of claim 20 wherein said operative connection includes: a coupling rotat-

ably connected to said crank; a pair of parallel oscillating and rotating bars; at least once spacer which interconnects said bars and maintains said bars in a spaced relationship, said rotating bar being mounted for rotation and said oscillating bar being pivotally connected to said coupling and being caused to reciprocate thereby, said shaking tray being adapted to be operatively connected to said oscillating bar and to be reciprocated thereby.

22. The combination of claim 21 wherein said operative connection between said oscillating bar and said shaking tray includes: a drive block adapted to be connected to said shaking tray and having a wall seated upon said oscillating bar, said oscillating bar imparting linear movement to said drive block.

23. The combination of claim 22 wherein said connecting rod rotates about a stationary axis which is parallel to but offset from the axis of the rotation of said drive shaft.